

## CLAIMS

1. A method of treating mechanical allodynia comprising administering to a therapeutically effective amount of a compound which inhibits the function of an NMDA  $\epsilon$ 4(NR2D) receptor protein.
2. A method according to claim 1, wherein the compound for inhibiting the function of an NMDA  $\epsilon$ 4(NR2D) receptor protein is an antagonist of the NMDA  $\epsilon$ 4(NR2D) receptor protein.
3. A method according to according to claim 2, wherein the antagonist is selected from the group consisting of  
( $\pm$ )-4-(4-phenylbenzoyl) piperazine-2,3-dicarboxylic acid (PBPD);  
(R,E)-4-(3-phosphonoprop-2-enyl)piperazine-2-carboxylic acid (D-CPPene); ( $\pm$ )-6-(1H-Tetrazol-5-ylmethyl)decahydroisoquinoline-3-carboxylic acid (LY23353);  $\alpha$ -Amino-5-(phosphonomethyl)[1,1'-biphenyl]-3-propanoic acid (EAB515); cis-4-(phosphonomethyl)piperidine-2-carboxylic acid (CGS 19755); D,L-(E)-2-amino-4-propyl-5-phosphono-3-pentenoic acid (CGP 39653); Tanshinone IIA; tanshinone IIB; 2-(3-methylphenyl)-2-adamantanemethanamine (CEB-1604); N1,N4,N8-tri-benzyl-spermidine (TB-3-4); and Memantine.
4. A pharmaceutical composition for treating mechanical allodynia comprising a compound as defined in claim 1 and a pharmaceutically acceptable diluent or carrier.

5. A method of screening for a compound which binds to NMDA  $\epsilon 4$ (NR2D),  
the method comprising the following steps (a) to (c):  
    (a) contacting NMDA  $\epsilon 4$ (NR2D) receptor protein with a test  
compound;  
5      (b) detecting the binding of the test compound to NMDA  $\epsilon 4$ (NR2D)  
receptor protein; and  
    (c) selecting a test compound that binds with the NMDA  $\epsilon 4$ (NR2D)  
receptor protein.
- 10 6. A method of screening for a compound which binds to NMDA  $\epsilon 4$ (NR2D),  
the method comprising the following steps (a) to (c):  
    (a) contacting a test compound with a cell that expresses an NMDA  
 $\epsilon 4$ (NR2D) receptor gene in the presence of a ligand of the NMDA  
 $\epsilon 4$ (NR2D) receptor protein;  
15      (b) detecting the activation of the NMDA  $\epsilon 4$ (NR2D) receptor; and  
    (c) selecting a compound for inhibiting the activation of the  
NMDA  $\epsilon 4$ (NR2D) receptor by comparison to the activation detected in the  
absence of the test compound.
- 20 7. A method of screening for a compound which binds to NMDA  $\epsilon 4$ (NR2D),  
the method comprising the following steps (a) to (c):  
    (a) contacting a test compound with a cell that expresses an NMDA  
 $\epsilon 4$ (NR2D) receptor gene;  
    (b) measuring the expression level of the NMDA  $\epsilon 4$ (NR2D)  
25 receptor gene; and

(b) selecting a compound that decreases the expression level in comparison to the level detected in the absence of the test compound.

8. A method of screening for a compound which binds to NMDA  $\epsilon$ 4(NR2D),  
the method comprising the following steps (a) to (c):

(a) contacting a test compound with a cell or cell extract containing DNA where the transcriptional control region of the NMDA  $\epsilon$ 4(NR2D) receptor gene is functionally linked to a reporter gene;

(b) measuring the expression level of the reporter gene; and

(c) selecting a compound that decreases the expression level of the reporter gene measured in step (b) above by comparison to the measurement conducted in the absence of a test compound.

9. A method for the determination of mechanical allodynia comprising;  
detecting abnormality of DNA in an NMDA  $\epsilon$ 4(NR2D) receptor gene or  
the control region of the gene.

10. A method for the determination of mechanical allodynia comprising a step  
of detecting the expression of an NMDA  $\epsilon$ 4(NR2D) receptor gene or the  
molecular weight of the expressed gene product.

11. A test agent for use in the determination of mechanical allodynia  
comprising a nucleic acid which hybridizes to an NMDA  $\epsilon$ 4(NR2D)  
receptor gene or the control region of the gene and contains at least the  
strand length of 15 nucleotides.

12. A test agent for use in the determination of mechanical allodynia comprising an antibody that binds with an NMDA  $\epsilon$ 4(NR2D) receptor protein.